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CHALLENGES IN THE IMPLEMENTATION OF ZERO WASTE CONCEPT IN JOHOR BAHRU CITY COUNCIL

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ABSTRACT

The Zero Waste Concept is an effective alternative to the management of solid waste that has been implemented in several developed countries to achieve sustainable development. This concept is applied to reducing solid waste generation that can minimize the depletion of natural resources, which in the meantime, to utilizing landfills as the last option in solid waste management. This study was conducted to identify the concept of zero waste used in the selected case study area. In addition, this study is to examine the challenges of the implementation of zero waste concept in the case study area. To in line with the focus of this study, the selected case study involved areas under the administration of Johor Bahru City Council, the local authority that administer most areas in Johor Bahru district. The respondents of this study comprised the representatives from Johor Bahru City Council, Solid Waste Management Corporation and SWM Environment. This study was conducted by interviewing five respondents consisting of Assistant Officer, Deputy Director, Senior Officer and Administration Division who are knowledgeable in managing solid waste in the country, thus responsible for sustainable development achievement. The collected data was analysed qualitatively using the descriptive technique. As a result, this study found there are four factors of challenges in implementing the zero-waste concept in the case study area namely management, financial, enforcement and social behaviour factors. This study can benefit those agencies in facing of challenges to implement the zero-waste concept so that this concept can be appropriately implemented. As such, several recommendations are made at the end of the study to ensure that the concept of zero waste can be implemented in Malaysia to assist the local authorities and other solid waste management agencies in improving their services in future.

1.0 INTRODUCTION

Worldwide, waste generation rates are on the rise (World Bank, 2017). With rapid growth and urbanization, municipal waste generation is expected to increase to 2.2 billion tones by 2025. In 2012, Sustainable Development Goals (SDGs) were set up at a United Nations conference on sustainable development in Rio de Janeiro. Their objective is to produce a set of universal goals that meet the urgent challenges facing the present environment, politics and economy that are facing today (United Nation Development Program, 2017). Promoting

economic growth from natural use is fundamental to sustainable development. However, global figures show a worsening trend where domestic consumption (the amount of natural resources used in the economic process) increased from 1.2 kg to 1.3 kg per unit from gross domestic product since 2000 to 2010. Total domestic consumption of goods also increased at the same time, from 48.7 billion tonnes to 71.0 billion tonnes (United Nation, 2017).

On October 24, 2017, United Nation called on Malaysia to achieve sustainable development goals. The Economic Perforce Unit (EPU) in the Prime Minister's Department leads the initiative to meet Malaysia's targets in line with the 11th Malaysia Plan (United Nation, 2017).

The issue of wastage of natural resources has long been taken place in Malaysia. In 2012, Malaysia produced 33,000 tons of solid waste every day (Ministry of Urban Wellbeing, Housing and Local Government 2012). In 2017, garbage collection statistics also increased. There are about 13.5 million tons of garbage produced annually (Utusan Online, January 7, 2017). There are 147 solid waste disposal sites still operating where 14 of them are sanitary landfills. The government also targets 18% of the solid waste generated to be treated with high technologies such as thermal treatment plants to reduce the country's dependence on landfills (KPKT, 2016). Good and effective waste management is essential to building sustainable and harmonious development to live. Yet it is a challenge for most developing countries and cities, where effective waste management costs are high. Typically, municipal budget allocations for waste management costs are between 20% to 50%. Such handling requires a system that is efficient, sustainable and socially supported (The World Bank, 2017).

Zero waste is one of the ongoing concepts in most outside countries with their solid waste management system. According to Wales Assembly Government (2009), zero waste is an end point of aspiration where all the waste generated will be used or recycled as a source without the need for any landfill or power restoration. In Malaysia, the zero-waste concept has begun to be applied in some areas. For example, at Fraser's Hill, SWCorp has partnered with Kitakyushu Town, Japan and Alam Flora Sdn Bhd to implement a green project that aims in making Bukit Fraser as a Zero waste area. The program was implemented to improve the management of solid waste especially in reducing wastes that should be disposed of at the landfill site (Astro Awani, 2016). Therefore, this study is conducted to nourish the concept of zero waste in Malaysia in order to encourage for more effective solid waste management to achieve sustainable development goals.

2.0 ZERO WASTE DEFINITION

'Zero waste' is a familiar term when the issues on solid waste levels, managing solid waste and recycling are raised in Malaysia. According to the Zero Waste International Alliance in 2004 (ZWIA, 2009), zero waste is an ethical, economic, efficient and insightful goal to guide people to change their lifestyles and practices to emulate sustainable natural cycles, where all waste materials are designed to be a resource that can be used by others. Zero gives meaning to planning and managing products and processes eliminating systematically avoiding the amount of waste toxicity and materials, preserving and restoring all sources and not burning or burying them.

In a statement by Wales Assembly Government (2009), zero waste is a final point of aspiration where all the waste generated will be used or recycled as a source without the need for any landfill or power recovery.

3.0 THE HISTORY OF THE IMPLEMENTATION OF ZERO WASTE CONCEPT

According to Atiq Uz Zaman (2014), zero waste is a visionary concept for dealing with waste among the people. The idea is being developed and implemented in various sectors including waste management and treatment, mining, manufacturing and urban development. The concept of zero waste has been introduced by policy makers as it stimulates production and utilization of resources, optimizes recycling and resource recovery. However, the profession in the waste management system uses it in different ways.

Neild Seldman (2016) also notes that this term changes to zero as a concept that has been brought to New Zealand's small towns on the first Siding Zero Waste in Kataia in December 2000 by the Warren Snow campaign. Today, zero waste is a standard for local organizations across the United States.

According to Palmer (2004), the term zero waste was formerly used in 1973 for resource recovery from chemicals. However, the concept has attracted the attention of the public in 1990. The number of organizations around the world has taken the concept of zero waste, devising zero disposal goals to landfill.

4.0 THE BENEFITS OF IMPLEMENTATION OF ZERO WASTE CONCEPT

Implementing the concept of zero waste is a driving force in sustainable development, which is a focus on economic, environmental and social sustainability. Therefore, among the advantages of the zero-waste concept to the economy, environment and social are:

i. Economy

According to the Toronto Environmental Alliance (2016), zero waste can help local circular economies and create jobs. Toronto's zero-digs create a circular economy, where every residue for a person is a source for something new. Recycling and composting programs create 10 times more jobs than disposal.

ii. Environment

Reducing, reusing and recycling can be a key part of climate change strategy to reduce greenhouse gas emissions. The United States Environmental Protection Agency (EPA) has estimated that about 42% of all greenhouse gas emissions are caused by the production and consumption of goods, including food, products and packaging. Reducing, reusing and recycling will conserve energy dramatically reducing carbon emissions.

iii. Social

This zero-waste approach also protects the health of the community and reduces air, water and soil pollution by avoiding toxic and solid waste from disposal to landfills and incinerator (Toronto Environmental Alliance, 2016).

5.0 ZERO WASTE STRATEGY THROUGH WASTE REDUCTION IN GLOBAL

There are various alternatives and initiatives that are being carried out by various parties especially the authorities in dealing with the issue of increasing solid waste that has an impact on natural resources, environmental pollution and so forth to achieve sustainable development. These include;

a) Plastic reduction

In 2002, San Francisco has set a goal of 75% redirects in 2010 and Zero Waste by 2020 (www.epa.gov, December 1, 2016). In a statement by the San Francisco Department of Environment, the cities and towns of San Francisco amended Chapter 17 of the Environmental Code, extending the plastic charter ban to include all grocery stores on January 10, 2012 and all food companies as of January 10, 2013. Checkout Bag Ordinance also imposes charges on permitted plastic bags such as composite bags, recycled paper bags or reusable bags. Charge is mandatory for 10 ¢ per checkout bag provided (sfenvironment.org, 2016).

According to Li-The Lu *et al.* (2005), as a way to promote a simpler life and gradually change consumer behaviour, Taiwan has chosen to try and reduce the use of plastic shopping bags and disposable dishes. The plastic bag restriction program was implemented in accordance with the "Use Restrictions" Article 21 of their Waste Disposal Act. The program restricts the use of disposable plastic bags and disposable dishes to multiple levels. It relies primarily on incentives and both subsidies to encourage businesses to introduce reusable shopping bags and dishes.

In Malaysia, since January 1, 2017, the Selangor state has reduced the use of plastic bags and stopped the use of polystyrene throughout the week. The Selangor State Government has been carrying out the Free Plastic and Polystyrene Bag Campaign beginning January 1, 2017. The enforcement is implemented daily at all business premises throughout the Selangor state. The implementation is as follows:

i. Disposable/single use plastic bags are no longer available to consumers for free.
ii. Charges will be charged for each plastic bag the user wishes to use.
iii. The use of food containers and equipment from polystyrene has been stopped.

Local Authorities have added conditions during the business license application where plastic bags are no longer provided for free, while the use of polystyrene is strictly prohibited. This enforcement is subject to the respective By-Laws of the Local Authorities (Local Authorities) (Tourism, Environment, Green Technology and Consumer Affairs Committee, 2017).

b) Reduction of food waste

In a statement by the Zero Waste Council (2017) article on The National Food Waste Reduction Strategy, the goal is to dramatically reduce the amount of food waste dumped at landfills and indirectly benefit Canada's economy, environment and communities. Managing waste is the responsibility of the local government. The policy is therefore an initiative to reduce food waste. Some of the content of the policy are:

i. Establish national food waste reduction targets.
ii. Encourage increased food donations to charities through tax incentives
iii. Reduces confusion about "best before", "use by", "sell by" and "expiry" dates.
iv. Implement a ban on disposal.

Malaysia has launched the Food Waste Management Development Plan for the Industrial, Commercial and Institutional Sectors (2016-2026) (PPPSM ICI) as one of the efforts taken to meet the challenges of achieving effective and efficient food waste management. Some strategies for reducing food waste are:

i. Development of a food waste generation database.
ii. Establishment of food recycling regulations.
iii. Reduction of food waste at source.
iv. Improving treatment facilities at cause.
v. Developing a system for food waste treatment.
vi. Methane gas recovery from disposal site.

c) Glass waste reduction

In the United States (US), both local and regional governments have intervened strongly to promote recycling of glass waste and to reduce the rate of waste. 10 states in the US have container deposit laws (also known as "bottle bills") that encourage redemption glass beverages as well as plastic bottles and aluminium cans, at the point of sale, for recycling. As a result, about a quarter of the glass containers are recycled or recycled annually (Samantha MacBride, 2012).

According to Sarah Currie-Halpern (2017), the City of New York reduced waste by reusing containers by adopting the Department of Health and Mental Code (Article 81, section 81.46). Restaurant premises are allowed to provide customers with reusable food containers for refill purposes. Thus, the production and waste of glass waste can be reduced by reusing the glass function.

d) Waste to energy

To produce cement requires fuel such as coal, which is a non-renewable natural source after use. However, the European Cement Industry has found an alternative to reducing the rate of solid waste. The European Cement Industry can use waste as an alternative fuel to regulate not only its competitiveness, but also to contribute to the social problem of waste management with environmental-oriented solutions. Today alternative fuel consumption in European

countries reaches up to 4 million tonnes a year, replacing about 2.5 million tonnes of coal a year (M. Zamorano *et al*., 2008).

e) Waste to money

In the book Recycling Reconsidered: The Present Failure and Future Promise of Environmental Action in the United States that in terms of practical solutions, zero waste in the US has a form of urban-based waste activism organized around a centralized social community. These companies can grow into "zero waste millionaires", the organization aims to support the social mission of zero waste and at the same time to profit (Lombardi and Rogers, 2007).

f) Zero waste place

In October 2008, the Government of England established Zero Waste Places (ZWP) as an initiative to implement innovative and exemplary practices (Department of Environment, Food and Rural Affairs (Defra), 2007a). By integrating areas (including cities, towns, and rural communities) to make collaborative offers with ZWP, successful applicants are then expected to exemplify good environmental practices on all waste issues. Participating areas will be asked to play a role in identifying illustrations and barriers to enable others to adopt the most effective approach. This is done with the hope that it will be implemented and serves as an example of a collaborative relationship between the Local Authorities and others including third parties on solid waste and environmental issues towards zero waste (Department of Environment, Food and Rural Affairs, DEFRA 2007)

In Japan there is also a city where Kamikatsu is a single waste collection depot, the city has gained global attention because in addition to making the area a place for recycling waste it also has a station where shops can donate items that are not in use and can bring back any items they have in the store that they want for free (www.japantimes.co.jp, February 23, 2017).

6.0 METHODOLOGY

Zero waste concept is an effective alternative in solid waste management which has been implemented in several developed countries to achieve sustainable development. Zero waste concept is applied to reduce solid waste generation and at the same time to use landfills as the last option in solid waste management. The aim of this study is to explain the challenges in the implementation of zero waste concept so that the goals of sustainable development can be realized. This paper deals with investigation on the challenges in the implementation of zero waste concept among Johor Bahru City Council, Solid Waste Management and Public Cleansing Corporation and SWM Environment. The collected data has been collected qualitatively using interview method.

This study was conducted through several stages which is preliminary study, literature review, data collection, data analysis and, conclusions and recommendations. The data has been collected through face to face interview using open-ended set of questions in order to obtain respondent's knowledge, insight, understanding, information and experiences. The interview questions focused on general question about the concept of zero waste and the challenges in the implementation zero waste concept in Johor Bahru City Council.

The respondents of this study involved five respondents from two different agencies. Two of the are the Assistant Officer under Health and Environment Unit from Johor Bahru City Council, one Deputy Director from SW Corp, one Senior Officer from SW Environment and one Administrator also from the SW Environment. In this study, the rationale of selecting a respondent from the Health and Environment Unit is because the department is directly involved and responsible with the implementation and monitoring the effectiveness of zero waste concept in the hierarchy of Johor Bahru City Council.

Table 5.1: Respondent information

Name	Position	Experience
Chairol Hisham Bin Jalaluddin	Deputy Director of SWCorp	10 years
Shahrul Amir Bin Abd Rahim	Assistant Officer (SWM Environment)	15 years
Jeffery Bin Rapi	Assistant Officer (MBJB)	15 years
Doris anak Lipen	Assistant Officer (MBJB)	7 years
Mohd Fahmi Bin Samuri	Branch Administrator (SWM Environment)	4 years

7.0 CASE STUDY AREA

Case study area for this research is focused in Johor Bahru involved the areas under the administration of Johor Bahru City Council or *Majlis Bandaraya Johor Bahru* (MBJB). MBJB was established beginning year 1933 when the Town Board was form, which was subsequently promoted to be the Town Council in 1950. In April 1977, the New Johor Town Council was upgraded to the Council Municipality of Johor Bahru (Town Council) and subsequently gained status on January 1, 1994.

The city of Johor Bahru is undergoing a transformation of economic development with rapid growth where it has also been identified as one of the most powerful competitiveness cities. Establishment of the Iskandar Region (IM), has then provided many benefits for the city's development especially in the context of domestic and foreign investor confidence to implement a variety of high impact investments in the city.

8.0 RESULT AND DISCUSSION

Qualitative analysis method was chosen in this study to analyse the primary data. Collected data in the form of views, suggestion or answers given by each respondent for each of the interview question asked was analysed accurately as to ensure that the objectives of this study can be achieved.

This study looks at the concepts used by Local Authorities, Perbadanan Pengurusan Sisa Pepejal dan Pembersihan Awam (SWCorp) and SWM Environment in implementing waste zones to reduce the impacts and issues on solid waste to achieve the state's goals that is, 'Johor as a prosperous city and a healthy environment'. This study also looked at the challenges faced by MBJB, SWCorp and SWM Environment in implementing the concept of zero waste in their administrative area. Therefore, the challenges in implementing this concept of zero waste taken into account some of the views and opinions of the

Based on the interview, the results show that there are challenges to implement zero waste concept which are in the context of enforcement, management, finance and community attitudes. It is hoped that the research information from this article is useful to encourage its implementation widely and overwhelming in achieving sustainable development.

This study found that the existing concepts used by MBJB, the Solid Waste and Public Cleansing Corporation (SWCorp) as well as the SWM Environment towards achieving zero waste are:

a) Johor Bahru City Council:
   - Clean Zone
   - Dengue Free Zone
   - Non-Smoking Zone

b) SWCorp & SWM Environment:
   - Separate at Source Programme (SAS)

The second objective of this study is to examine the challenges faced in the implementation of the zero-waste concept by MBJB, SWCorp and SWM Environment. To find out these challenges is imperative as this study is aimed to assist agencies in reducing the problem of increasing solid waste generation and environmental health and pollution problems that are faced in stages and thus helping to achieve the Johor State Structure Plan 2020. The challenges can be categorised into four factors or aspects, which are as follows:

i. Enforcement aspect

There is no specific law or act empowers rights to MBJB. The power given only focuses on controlling the failure of households and traders in carrying out the responsibility of removing

solid waste packs into the proper place which will result in the breeding of mosquitoes and rats and carrying out disease outbreaks.

ii. Management aspect

In any planning and project that is to be implemented and where it is carried out, management is among the most important aspects in determining such success. As a result of the interview, researchers found that the challenges in management aspects when implementing the concept of zero waste are in terms of employees' welfare. This zero-waste concept requires a lot of work processes but allowances or incentives to employees involved are lacking. Besides, the agencies are lacking staff to implement the concept of zero waste; whereas, this concept deals with a lot of work procedures, thus requires sufficient number of employees to support them.

iii. Financial aspect

There are also problems in the financial allocation for maintaining and managing solid waste systems. Their lack of financial injection from the government would make it difficult for public solid waste management and public cleansing companies to run large-scale programs. This lack of financial injection will complicate the implementation of the zero-concept concept since this concept requires a whole-shift in terms of management and processing technologies of recyclable solid waste types requiring large financial injection in the beginning stage to initiate the concept of zero waste.

iv. Behaviour of society

The mind-set of the society to aware with the importance of this zero-concept concept to themselves is still poor. Malaysians prefer to work for something that can benefit them directly as incentives of their collaboration for solid waste separation. If incentives are not provided, their cooperation is far to achieved and will further delay the success of the zero-waste concept.

The Table 9.1 below shows the respondent's view of the challenges of implementing the zero-waste concept.

		Respondents				
No.	Aspect	R1	R2	R3	R4	R5
1	Enforcement	/	/	/	/	/
2	Management	/		/	/	
3	Financial			/	/	
4	Society-Behaviour	/		/	/	

9.0 CONCLUSION

This study is to identify concept used by the Authority Local (Local Authority), Solid Waste Management and Public Cleansing Corporation (SWCorp) and SWM Environment in implementing zero waste concept to reduce the effects and issues of solid waste as to achieve the state's goal to be a prosperous city with healthy surroundings. This study also examined the challenges faced by MBJB parties, SWCorp and SWM Environment in working on the concept of zero waste in their administrative areas.

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